



Bent-Wire Crank Toy

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TOOLS:

- [Pliers \(1\)](#)
- [Pliers \(1\)](#)
[A second pair is optional but handy.](#)
- [Ruler \(1\)](#)
- [Templates \(1\)](#)
*[Download them from](#)
<http://makeprojects.com/v/29>.*



PARTS:

- [Wire, 20 AWG, bare \(1\)](#)
*[We got a spool of fence wire that will](#)
[last for a long time for \\$3.](#)*
- [wire snips \(1\)](#)

SUMMARY

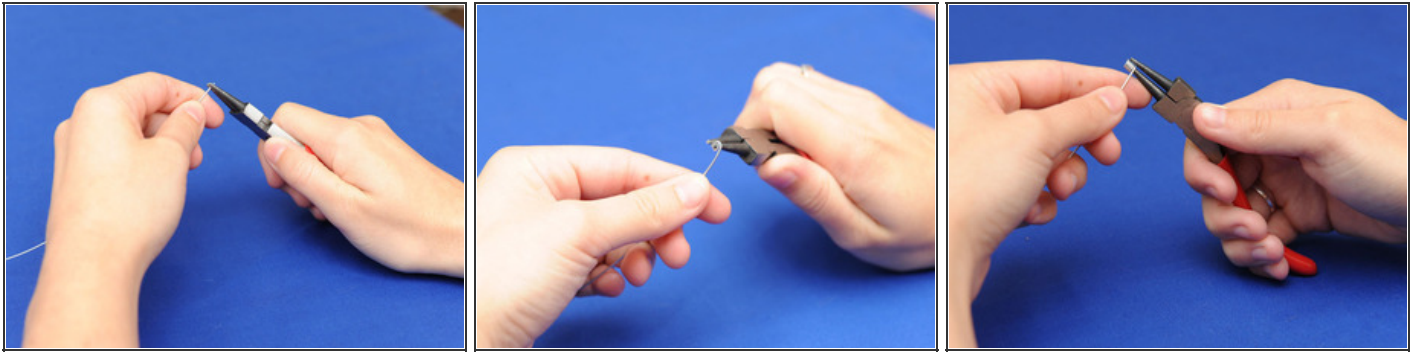
Making things with wire looks simple, but it can be challenging. Pick up a few wire-bending tricks, though, and you can sketch in 3 dimensions and make anything from a tiny, delicate figurine to a large, mechanical sculpture with moving parts.

Like sketching with a pen on paper, there's no right way to do it, but a few techniques can help you get started. We'll show you how to make a functional crank toy using a few basic tools and ordinary fence wire. Along the way, you'll learn some important bends and structures you can use in your own creations.

Our crank toy is made up of 5 pieces: frame, crankshaft, piston, connecting rod, and art. Each part is made separately using individual pieces of wire, but you need to construct them

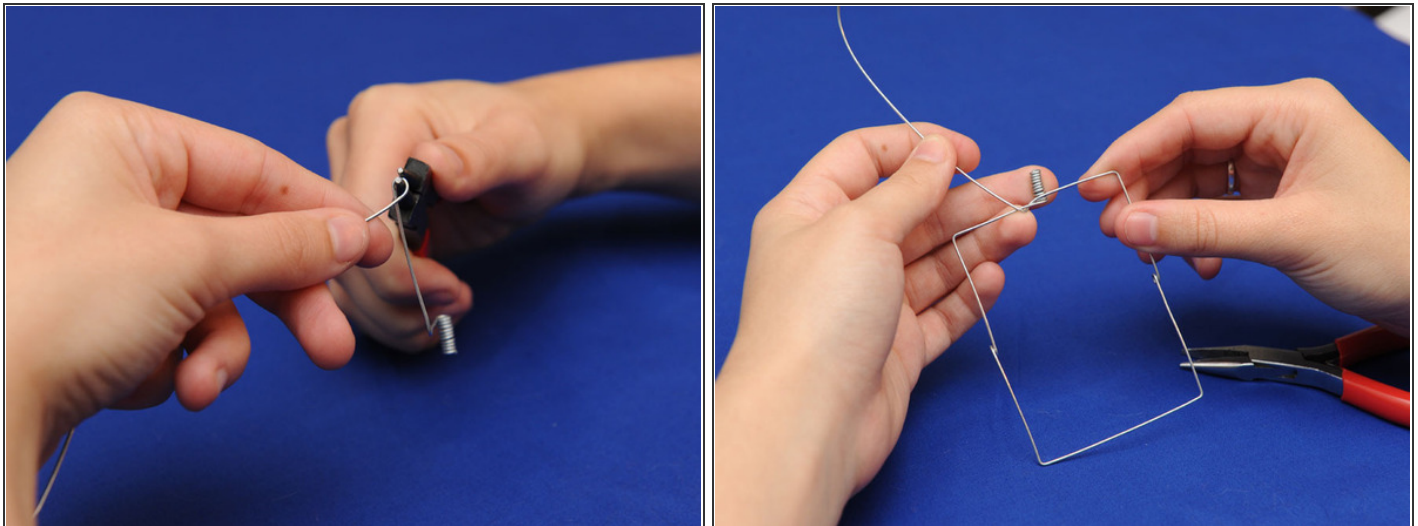
in the right order so they'll fit together correctly. To make it easier, we've made a template (PDF) to guide you. Download it below, and use the template and the photos here for reference.

Step 1 — Fabricate the frame.



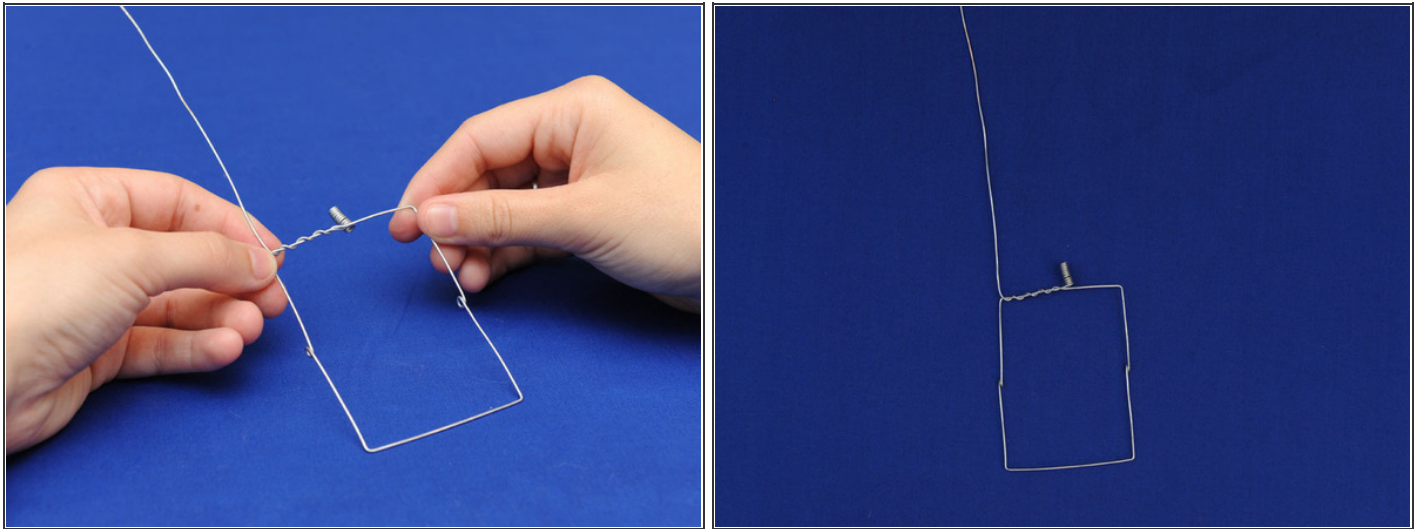
- Measure out about 24" of wire. Start by making the cylindrical coil at the top of the frame.
- Wrap your wire around a prong of your pliers (round-nose work best), and bend into a coil, slipping the coil off as it grows.

Step 2 — Fabricate the Frame (continued)



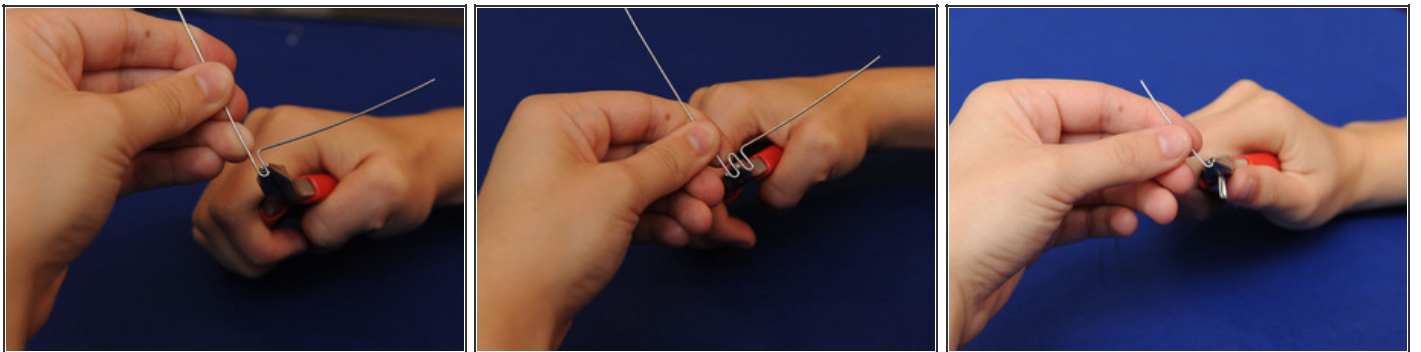
- Working your way around the template, grip the wire in the pliers' jaws and bend it to make a right angle.
- To make a continuing loop, grab the wire at the intended location of the loop with the tip of the pliers and wrap.

Step 3 — Fabricate the frame (continued)



- Wrap the trailing edge of wire around the top of the frame to the far corner and leave the end long for now.

Step 4 — Create the crankshaft



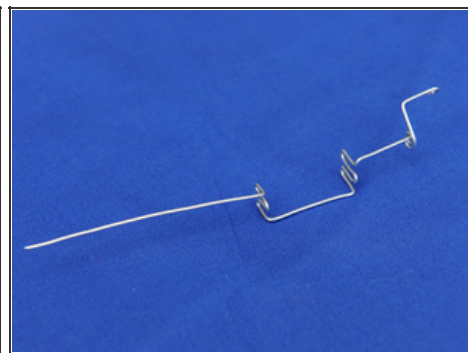
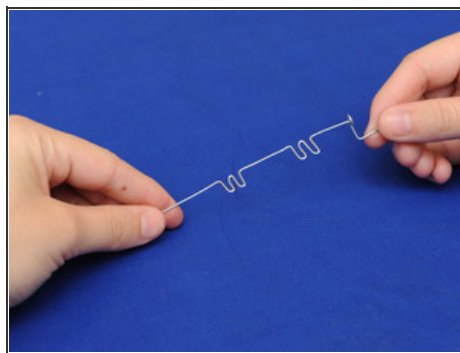
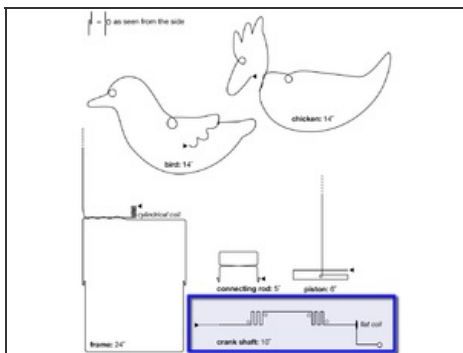
- Measure out about 8" of wire.
- To make a zig-zag, make a series of 180° bends around the tips of the pliers, then tighten them by squashing them with pliers

Step 5 — Create the crankshaft (continued)



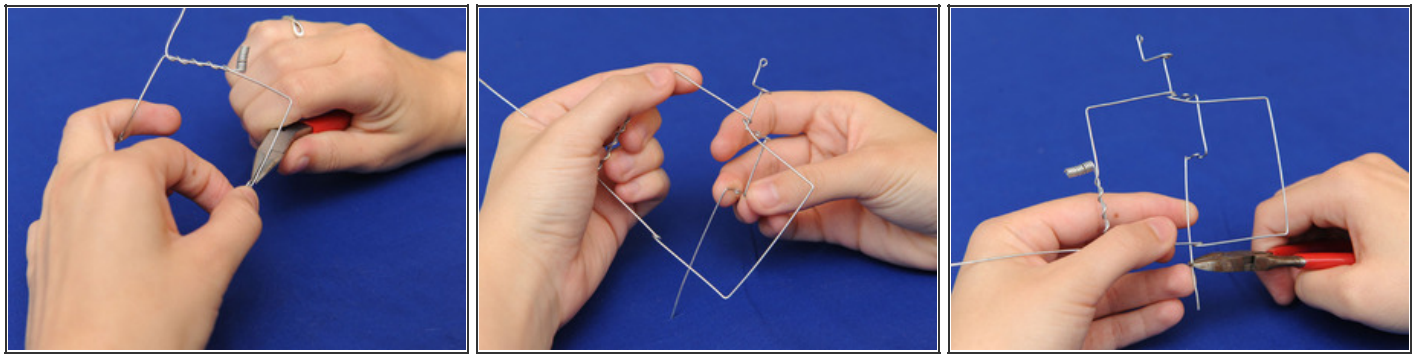
- To make a flat coil, twist a loop perpendicular to the main shaft, then continue to spiral the wire around the loop, keeping it in plane by gripping it with the pliers

Step 6



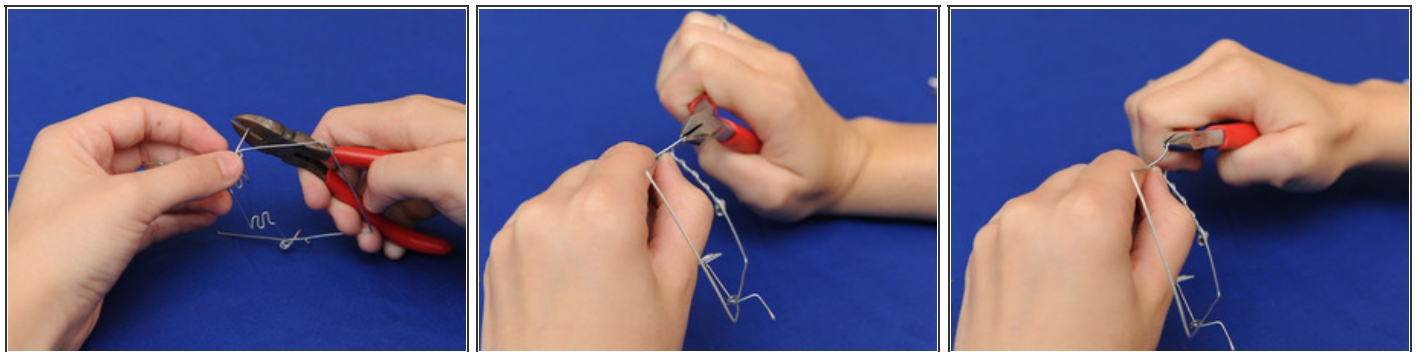
- Create the crankshaft (continued)
- After completing it as shown on the template, make right-angle bends (indicated with stars), perpendicular to the plane of zig-zags, to finish the crankshaft

Step 7 — Create the crankshaft (continued)



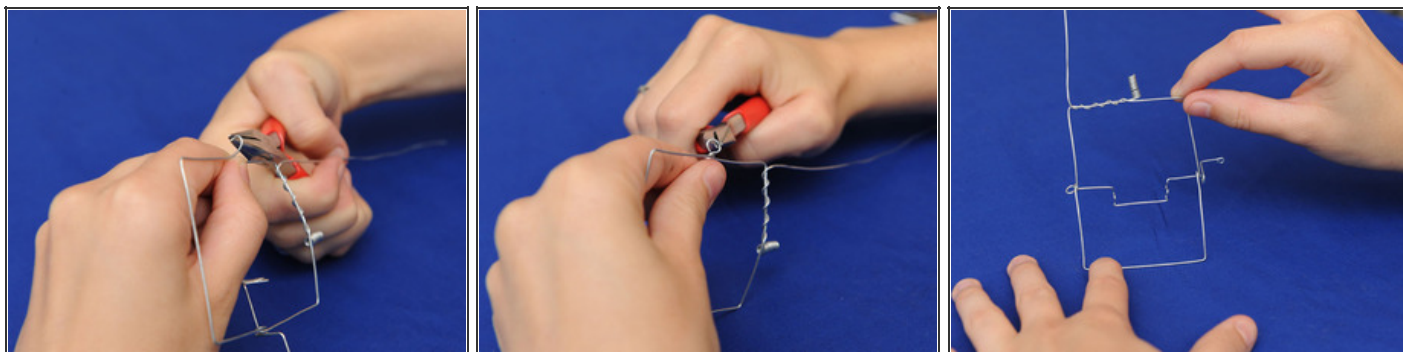
- Open the continuing loop on the side of the frame away from the trailing edge by twisting it sideways.
- Slide the handle end of the crankshaft into the open loop. Trim the long end of the shaft to slip it through the opposite loop

Step 8 — Create the crankshaft (continued)



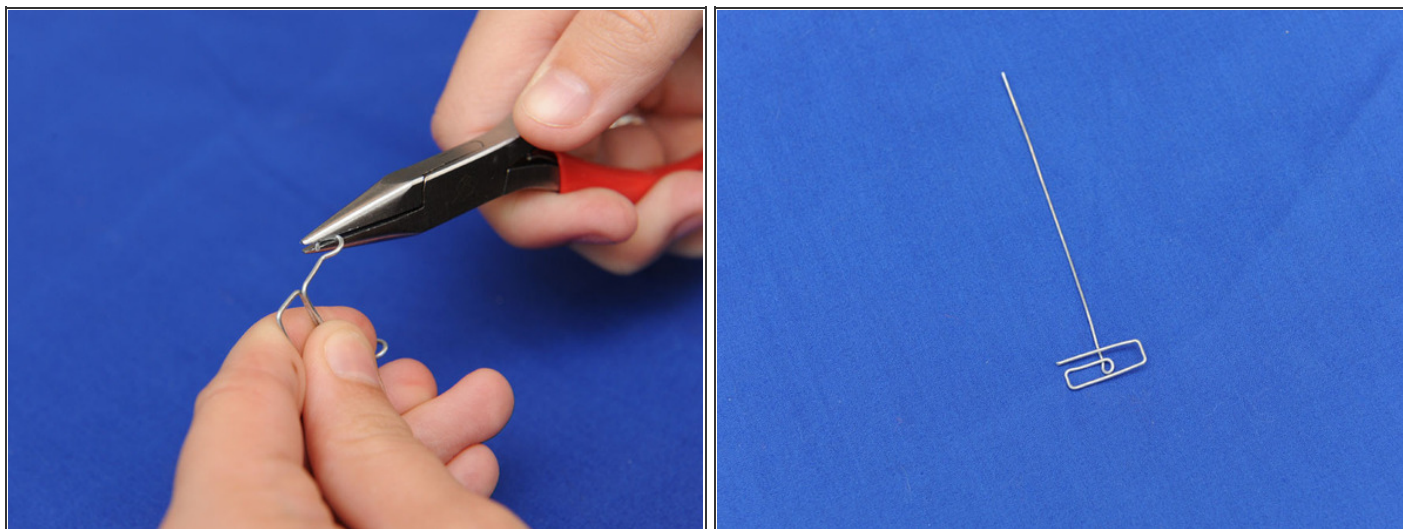
- Make a terminal loop to secure the crankshaft in the frame.
- Make a right angle bend in the crankshaft just on the outside of the frame, and trim the trailing end to about 1/2".

Step 9 — Create the crankshaft (continued)



- Turn it so the bent end is facing you. Grip the end in the tip of the pliers, and curl the end back in one smooth motion.
- Neaten the loop with the tips of the pliers
- And you've finished the crank

Step 10 — Prepare the piston



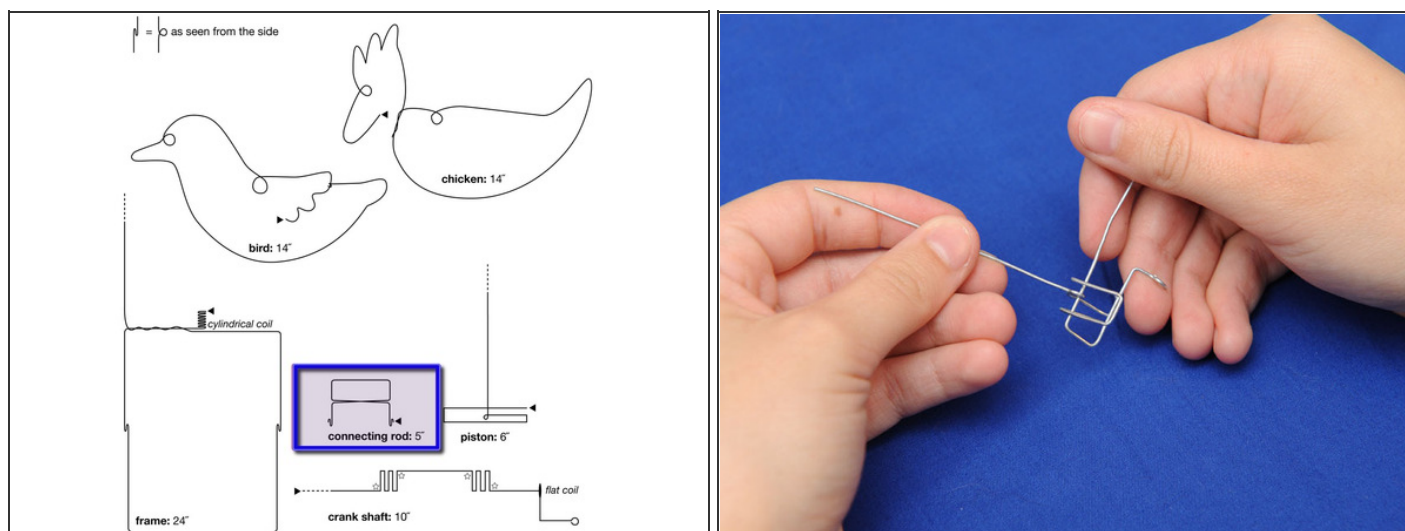
- Measure and cut 6" of wire.
- Follow the template to create the basic shape (second image).

Step 11 — Prepare the piston (continued)



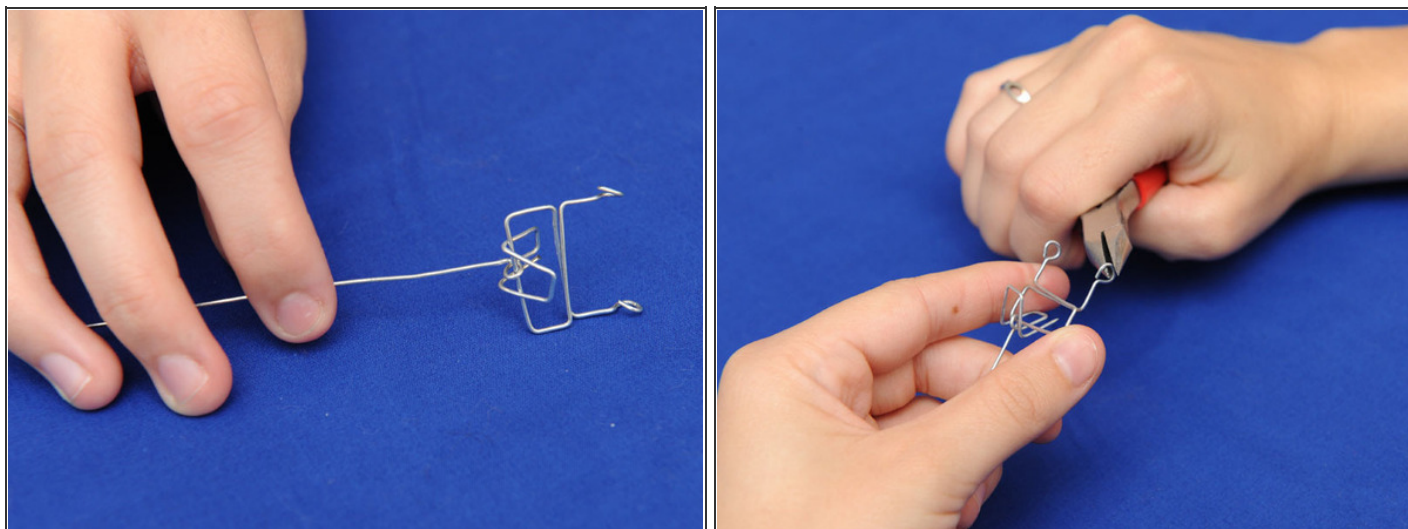
- Grip both long edges of the rectangle in the pliers, then bend the rectangle over to make a V in profile.
- Twist the loop so that it lies parallel to the V edges. Leave the long end trailing.

Step 12 — Construct the connecting rod



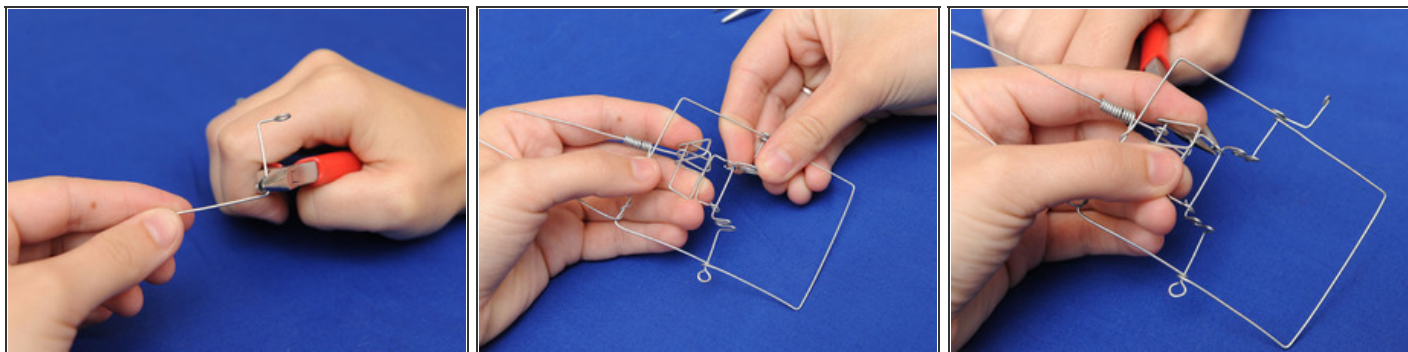
- Measure 5" of wire and follow the template for the first half of the connecting rod.
- Slide the piston onto the top edge of the rod, with the V edges straddling the sides

Step 13 — Construct the connecting rod



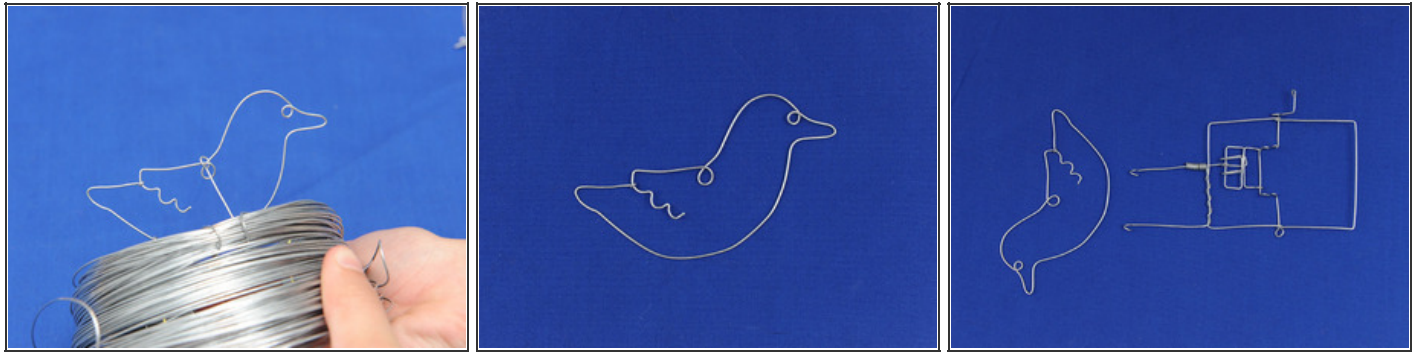
- Complete the template shape
- Twist open the loops at the base of the connecting rod.

Step 14 — Mount the mechanism



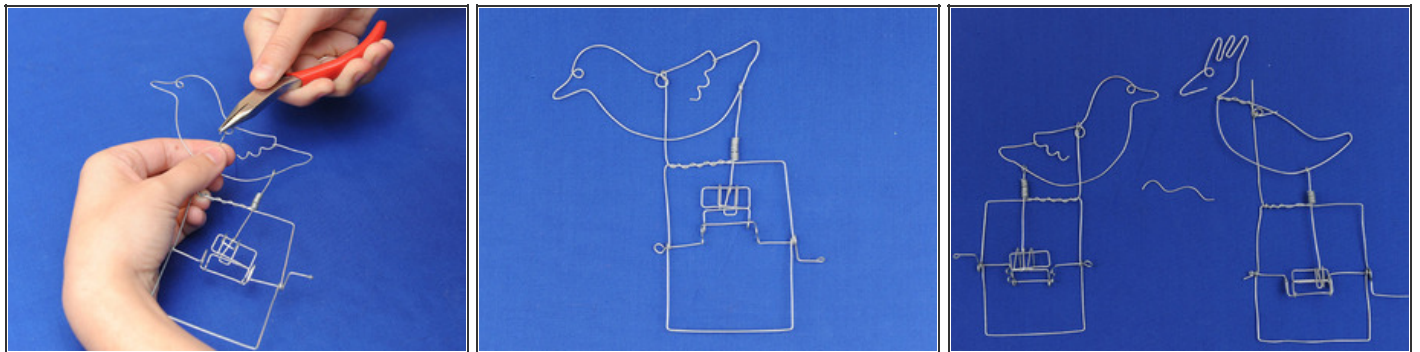
- Thread the trailing end of the piston through the cylindrical coil on the frame.
- Hook the base of the connecting rod onto the crankshaft.
- Close the loops by twisting them back into position.

Step 15 — Build the bird.



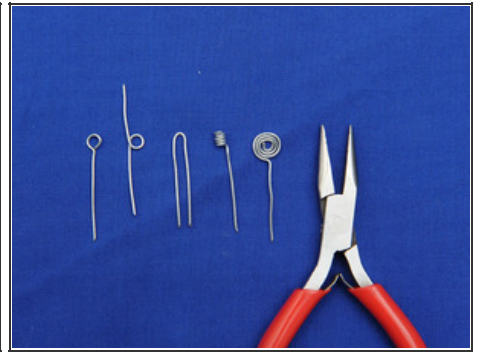
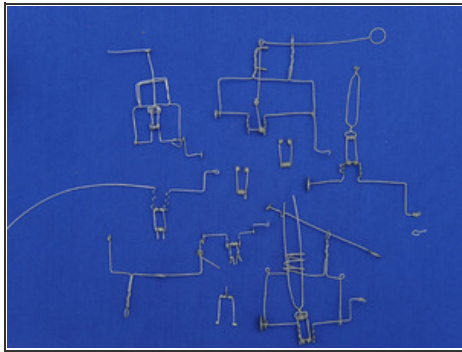
- Follow the template to bend your choice of bird.
- Turn a loop at the top of the piston, and another at the top of the frame.

Step 16 — Attach the bird



- Twist open the loops, attach the bird, and close them.
- And you're done :)

Step 17 — Further Inspiration



- Alexander Calder, famous for his mobiles, also experimented with directed motion in expressive, evocative bent-wire crank toys.
- [Arthur Ganson's soldered wire automata](#) are lovely and futile. His work is fascinating

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